

Topics in Genomics and Computational Biology

Plant and Microbial Biology C246
Molecular and Cellular Biology C246

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Students successfully completing this course will have a general understanding of topics in computational biology and genomics, will be able to critically analyze and understand experiments and research articles in these fields, and will be able to perform standard computational genomics analyses.

Meetings	Tu, Th 5-7 PM + 1 section (optional; to be scheduled)
Location	GPB107
Course notes	scribe system
Course websites	c246.lbl.gov
Enrollment	Limited to 44 (22 in each department)
Auditors	May constitute maximum 10% of class; written application required

Grading letter grade or SAT/NS

25% class participation and preparation
attendance at 80% of classes mandatory
one formal presentation will be required of all students

25% homework

50% exams and project

10% midterm/40% final project
or
20% midterm/30% final exam

Prerequisites

Students are expected to have solid background in genetics and molecular biology. Ability to write simple programs strongly suggested; final projects, if selected, will typically require programming.

Course Material

No required textbook. Recommended references will available on course website. Additional material may be on reserve at biosciences library. Students will be expected to obtain information from journals and websites and to use web-based software. Access to a machine with molecular biology software and the internet will be essential (see instructors if access is a problem).

Topics

History of Genetics/Genomics
Genome Sequencing Methods
Sequence Assembly
Gene Finding
Homology
Uses of Homology
Comparative Genomics
Secondary Structure Prediction
Ab initio Folding Methods
Fold Recognition
Homology Modeling
Structure-Homology Relationships
Structure Comparison, Classification
Structural Genomics
ORFans
Systematics Methods
Phylogeny/Phylogenomics
DNA Arrays and Applications
Correlation Methods
Relationships Between Gene Expression and Genome Sequences
Non-coding DNA
Proteomics
Genomics and Tumor Classification
Genetic Mapping
Introns Early/Introns Late Debate
Systematic Footprinting
Systems Modeling